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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/879,838	06/12/2001	Ralph L. Beck	ATC-001 (5051/2)	3676

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EXAMINER

RAMPURIA, SATISH

ART UNIT	PAPER NUMBER
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2124

DATE MAILED: 07/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/879,838

Applicant(s)

BECK ET AL.

Examiner

Satish S. Rampuria

Art Unit

2124

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06/12/2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4, 7, 8, 9, 10
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

***DETAILED ACTION***

1. This action is in response to the application filed on 06/10/2001.
2. Claims 1-14 are pending.

***Specification***

3. The use of the trademark "Java" has been noted in this application. It should be appropriate or proper term (see MPEP 608.01(v)) used, wherever it appears and be accompanied by the generic terminology. Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

Appropriate correction is required

***Information Disclosure Statement***

4. An initialed and dated copy of Applicant's IDS form 1449, Paper No. 04, 07, 08, 09, and 10, are attached to the instant Office action.

***Claim Rejections - 35 USC § 112, second paragraph***

5. Claims 1, 8-10, and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Clarification and/or correction are required.

Regarding, claim 1, on lines 2, the limitation, "one or more" is unclear as to how many objects are including in the software. And, lines 6-7, the limitation, "at least one of the following steps" is unclear as to which step is being used in instrumenting.

Claim 13, has the similar limitation to those in claim 1 with respect to "one or more", recited on the line 2, and line 8, the limitation, "at least one of the following steps".

Regarding, claim 8, on lines 2, the limitation, "instrumentaion to or modifying" is unclear at to this step is intrumenting or modifying the class. And, line 3 the limitation "one or more" is unclear as to class is being substituted by which component.

Claim 10, has the similar limitation to those in claim 9 with respect to "instrumentaion to or modifying", recited on the line 2.

Regarding claim 9, on lines 3 and 4, the limitation, "one or more" is unclear as to which memory location is substituted.

Claim 10, has the similar limitation to those in claim 9 with respect to "one or more", recited on the lines 3 and 4.

The rejection of the base claim is necessarily incorporated into the dependent claims.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 8, 9, 10, 11, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,314,558 to Angel et al., hereinafter called Angel, in view of US Patent No. 6,026,237 to Berry et al., hereinafter called Berry.

**Per claim 1:**

Angel disclose:

- A method for instrumenting virtual-machine-executable software (col. 3, lines 16-17 “instrumenting a byte code computer program”), the software including one or more objects (Fig. 3, element 46) each object being defined by a class (col. 4, line 13-14 “storing an identifier for the object class”), each class being associated with a class-hierarchy location (col. 7, lines 32-33 “The instrumentation software 63 uses the IR tree data element 66”), the method comprising the steps of:
  - (a) identifying at least one target class included within the software (col. 5, line 66 “object code 46 is target-specific”), the at least one target class being associated with a first class-hierarchy location and with a first class name (col. 7, lines 32-33 “The instrumentation software 63 uses the IR tree data element 66”);
  - (b) for each target class, adding instrumentation to the software (col. 3, lines 22-23 “Instrumenting a portion of the byte code corresponding to a method call”) according to at least one of the following steps:
    - (iii) adding instrumentation to the target class without modifying bytecode within the target class (col. 3, lines 22-23 “Instrumenting a portion of the byte code corresponding to a method call”);

- (c) causing a virtual machine to process as the target class the class assigned the first class name (col. 20, lines 62-63 “Byte code may be instrumented by instrumenting each class as the class is loaded by the VM runtime system”).

Angel does not explicitly disclose (i) creating a new class adding instrumentation to the new class; and (ii) creating a new class, adding instrumentation to the new class.

However, Berry discloses in an analogous computer system (i) creating a new class (col. 7, line 15 “The modified class file is then created (step 522)”), adding instrumentation to the new class (col. 5, line 21 “adding code for the purpose of instrumentation”); and (ii) creating a new class (col. 7, line 15 “The modified class file is then created (step 522)”), adding instrumentation to the new class adding instrumentation to the new class (col. 5, line 21 “adding code for the purpose of instrumentation”).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the method of creating a class and adding instrumenting to a class for as taught by Berry into the method of byte code instrumenting as taught by Angel. The modification would be obvious because of one of ordinary skill in the art would be motivated to create new and add instrumenting to the class to provide code analyzer and performance measurement as suggested by Berry (col. 2, lines 7-31).

**Per claims 8, 9, and 10:**

The rejection of claim 1 is incorporated, and further, Angel does not explicitly disclose wherein the virtual-machine is a Java virtual machine and the steps of adding instrumentation to or

modifying the at least one target class include adding, removing, modifying, reordering or substituting one or more of the following named class components: (i) class name (ii) super class name (iii) interface index array (iv) field table (v) method table (vi) constant pool (vii) attribute table (viii) index array (ix) access flags.

However, Berry discloses in an analogous computer system wherein the virtual-machine is a Java virtual machine and the steps of adding instrumentation to or modifying the at least one target class include adding, removing, modifying, reordering or substituting one or more of the following named class components (col. 5, lines 20-24 “Code may be added to, deleted from, or modified in the Java class file for many reasons, including instrumentation, benchmarking, performance tuning, modifying functionality, applying functional or performances patches” and col. 5, lines 29-33 “FIG. 5 illustrates the steps of transforming the class file components and then reconstructing the class file, specifically for the purpose of adding performance instrumentation code at the entry and exit of every method contained in the class file”): (i) class name (ii) super class name (iii) interface index array (iv) field table (v) method table (vi) constant pool (vii) attribute table (viii) index array (ix) access flags. All of the components would be obvious in a class.

The feature of modifying class would be obvious for the reasons set forth in the rejection of claim 1.

**Per claims 11 and 12:**

The rejection of claim 1 is incorporated, and further, Angel does not explicitly disclose modifying the new class to recognize a super class associated with the target class as the super

class associated with the new class; modifying the target class to recognize the new class as the super class associated with the target class.

However, Berry discloses in an analogous computer system modifying the new class to recognize a super class associated with the target class as the super class associated with the new class (col. 1, lines 60-62 “Object class have a superclass and that all field and method references in the constant pool have valid names, classes, and type descriptors”); modifying the target class to recognize the new class as the super class associated with the target class (col. 1, lines 60-62 “Object class have a superclass and that all field and method references in the constant pool have valid names, classes, and type descriptors”).

The feature of modifying the class, as a super class would be obvious for the reasons set forth in the rejection of claim 1.

**Claim 13** is the apparatus claim corresponding to method claim 1 and rejected under the same rational set forth in connection with the rejection of claim 1 above.

8. Claims 2, 3, 5, 6, 4, 7, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angel, in view of US Patent No. 6,405,367 to Bryant et al., hereinafter called Bryant.

**Per claims 2, 3, 5, and 6:**

The rejection of claim 1 is incorporated, and further, Angel disclose:

- (aa) after completing step (a), operating a virtual machine to initiate loading and execution of the virtual machine executable software (col. 20, lines 62-63 “Byte code



may be instrumented by instrumenting each class as the class is loaded by the VM runtime system”).

Angel does not explicitly disclose (ab) after completing step (aa) suspending the operation of the virtual machine after loading and before linking the at least one target class; (ca) after completing step (c), un-suspending operation of the virtual machine.

However, Bryant discloses in an analogous computer system (ab) after completing step (aa) suspending the operation of the virtual machine after loading and before linking the at least one target class (col. 6, lines 56-57 “The application program 140 suspends processing until the return of data at step 145” also fig. 7); (ca) after completing step (c), un-suspending operation of the virtual machine (col. 6, lines 57-60 “After data is received from the server, the application program 140 unsuspends itself to receive the data and error output of the child Java server 180 and to receive any exit status at step 146” also fig. 7).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the method of suspend and un-suspending virtual machine as taught by Bryant into the method of byte code instrumenting as taught by Angel. The modification would be obvious because of one of ordinary skill in the art would be motivated to suspend and un-suspend the machine to provide the high performance execution of JAVA application as suggested by Bryant (col. 2, lines 10-24).

**Per claims 4 and 7:**

The rejection of claim 1 is incorporated, and further, Angel disclose:

- wherein the virtual-machine is a Java virtual machine (col. 20, lines 25-26 “virtual machine (VM) runtime system that interprets and runs byte code, such as Java byte code”) and the step of identifying at least one target class included within the virtual machine executable (col. 20, lines 39-41 “the class instance 406 is provided as an input to the VM runtime module 404 which interprets and executes the executable steps of the class instance 406”) software includes the steps of:
  - (a) specifying a set of class attribute names and associated value descriptions matching class attribute names and associated values possessed by at least one class included in the virtual-machine-executable software, (col. 26, lines 21-26 “Processing at the step 612 may include modifying the native attribute of the method to convert the method to a byte code method, creating a new name for the native method and adding the new name as a private native method declaration, and adding byte code instructions to call the native method under the new name” and the rest of col. 26 and 27) the set including one or more of the following attribute names: (i) a class name (ii) an interface name (iii) a parent class name (iv) an inherited method name (v) a defined method name (vi) a private method name (vii) an inherited field name (viii) a defined field name (ix) a private field name (x) constant value attribute (xi) synthetic attribute (xii) code attribute (xiii) exception attribute (xiv) depreciated attribute. All of the attributes would be obvious within a class.

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- (c) classifying the at least one class as a target class (col. 5, line 66 “object code 46 is target specific”).

Angel does not explicitly disclose (b) searching for at least one class possessing class attribute names and associated values consistent with the specified class attribute names and associated value descriptions; and (c) classifying the at least one class as a target class.

However, Bryant discloses in an analogous computer system (b) searching for at least one class possessing class attribute names and associated values consistent with the specified class attribute names and associated value descriptions (col. 7, lines 45-53 “The child Java server 180 then maps, at step 183, to the specified application (i.e., class and method) identified in the information that was communicated over the pipe connection and received at step 182... executes the specified application (i.e., class and method) using the specified program name, execution arguments”).

The feature of searching for class and attributes would be obvious for the reasons set forth in the rejection of claim 2.

**Claim 14** is the apparatus claim corresponding to method claim 4 and rejected under the same rational set forth in connection with the rejection of claim 4 above.

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patent is cited to further show the state of the art with respect to code instrumentation.

US Patent No. 5,987,249 to Grossman et al.

US Patent No. 6,072,953 to Cohen et al.

US Patent No. 6,216,237 to Klemm et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Satish S. Rampuria whose telephone number is 703-305-8891. The examiner can normally be reached on 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki can be reached on (703) 305-9662. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Satish S. Rampuria

Patent Examiner

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06/28/2004

  
**ANIL KHATRI**  
**PRIMARY EXAMINER**